

TRANSURANIC (TRU) WASTE CERTIFICATION PROGRAM
WASTE MANAGEMENT OPERATIONS ADMINISTRATIVE PROCEDURE

*COLLECTION, REVIEW, AND MANAGEMENT OF
ACCEPTABLE KNOWLEDGE DOCUMENTATION*

BATTELLE
505 King Avenue
Columbus, Ohio 43201

Procedure Status:

- ☒ Non-Critical Procedure
☐ Critical Procedure – Procedure
Qualification Packet (PQP) Required

REVISION RECORD INDICATING LATEST DOCUMENT REVISION

Title Collection, Review, and Management of

No. TC-AP-03.1

Acceptable Knowledge Documentation

Page i of ii

INDEX OF PAGE REVISIONS

Page No.	i	ii								
Rev. No.	4	4								

Page No.	1	2	3	4	5	6	7	8	9	10
Rev. No.	4	4	4	4	4	4	4	4	4	4

Page No.	11	12	13	14	15	16	17	18	19	20
Rev. No.	4	4	4	4	4	4	4	4	4	4

Page No.	21	22	23	24	25	26	27	28	29	30
Rev. No.	4	4	4	4	4	4	4	4	4	

Page No.										
Rev. No.										

REVISION RECORD	
Rev. No.	Date
1	4-22-98
2	7-19-99
3	6-20-00

REVISION RECORD	
Rev. No.	Date

CURRENT REVISION	
Rev. No.	4
Issue Date	
Issued By	

PROCEDURE APPROVAL PAGE

Prepared By:

P. Erickson
TRU Waste Certification Official

Date

This procedure, *TC-AP-03.1, Collection, Review, and Management of Acceptable Knowledge Documentation*, has been reviewed and approved by the following.

Approved By:

J. Eide, Site Project Manager
TRU Waste Certification Program

Date

M. E. Jackson
Manager, Regulatory Compliance & Environmental
Safety, and Health Oversight

Date

P. Weaver
Manager, Field Operations

Date

N. J. Gantos, Manager
Decontamination & Decommissioning Operations

Date

G. Eriksen
Manager, Quality

Date

COLLECTION, REVIEW, AND MANAGEMENT OF ACCEPTABLE KNOWLEDGE DOCUMENTATION

1.0 Scope

This procedure applies to all Department of Energy (DOE) Columbus Environmental Management Project (CEMP), Battelle Columbus Laboratories Decommissioning Project (BCLDP) personnel and subcontractors performing acceptable knowledge (AK) collection, review, and compilation. This procedure also addresses the resolution of discrepancies identified between AK sources and data generated during AK confirmation operations.

Unacceptable waste items are identified and segregated from the transuranic (TRU) waste containers during packaging in accordance with TC-OP-01.4, Segregation and Packaging of TRU Waste (Reference 3.1.15) and the task specific work instruction prepared for each packaging process. Each waste item is inspected and absence of unacceptable waste materials is documented in accordance with TC-OP-01.4. In addition, audio and video verification of waste matrix is performed in accordance with TC-OP-01.5, Packaging Video Documentation (Reference 3.1.16). Any nonconformances identified during subsequent TRU waste certification operations will be resolved in accordance with QD-AP-15.1, Nonconformance Reporting for Activities, Items, and Materials (Reference 3.1.12).

Confirmatory data associated with headspace gas and solid sampling are generated by vendors specializing in mobile systems characterization. The vendor's are responsible for implementing project-specific procedures that address and meet all applicable requirements specified in TCP-98-02, Transuranic Waste Characterization Quality Assurance Project Plan (QAPjP). The QAPjP specific responsibilities and applicable vendor procedures are described in TCP-98-04, Mobile Vendor Interface Plan (Reference 3.1.18). Direct sampling of the waste matrix will be performed for containers of homogeneous solids (Summary Category 3000) and soil/gravel (Summary Category 4000) for volatile organics, semivolatile organics, and metals. Radiological confirmation sampling for remote handled (RH) TRU waste will be performed by BCLDP personnel in accordance with WA-OP-033, Sampling of Waste Materials for Chemical and/or Radiological Characterization (Reference 3.1.21). PCB analysis will also be performed on containers of organic sludges (Waste Matrix Code S3220) should these materials be identified, or if AK is insufficient to verify the absence of these compounds in the waste matrix. Confirmation testing requirements for each BCLDP TRU waste stream is identified in TCP-98-03.1, Newly Generated Waste Process Descriptions.

2.0 **Purpose**

This procedure outlines the method used to collect, review, compile, and manage AK documentation. Implementation of this procedure assures that a consistent, defensible, and auditable record is created for transuranic (TRU) waste currently stored at the West Jefferson North site.

AK collected and reviewed is compiled into a reference document that presents the information in a logical sequence progressing from general TRU waste management and site operations to more detailed, waste stream-specific information in accordance with the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Permit, Attachment B, Waste Analysis Plan (WIPP-WAP) (Reference 3.1.7), and the Transuranic Waste Characterization Quality Assurance Project Plan for the BCLDP TRU Waste Certification Program (QAPjP; Reference 3.1.17).

Implementation of this procedure creates three primary sources of published AK documentation:

TRU Waste Management Documentation (Section 5.3) – This report summarizes the required TRU waste management information required by the WIPP-WAP, including the preliminary characterization of waste populations that represent the inputs to the BCLDP TRU waste packaging processes. This AK document is prepared for each facility that historically generated TRU waste.

AK Process Descriptions (Section 5.4) – These reports summarize the TRU waste stream information required by the WIPP-WAP and the WIPP Waste Acceptance Criteria (WIPP-WAC) for TRU waste streams. These reports are prepared prior to TRU waste processing to describe the waste inventory to be processed, process inputs, and TRU waste stream characterization. These reports are updated during and after waste processing as necessary to identify any process deviations and resolve discrepancies.

TRU Waste Confirmation Report (Section 5.5) - These reports are prepared in conjunction with the AK Summary Report and Waste Stream Profile Form (WSPF) (DDO-454-W) to verify AK, resolve discrepancies identified during confirmation testing, and ensure that the Program Data Quality Objectives (DQOs) have been achieved based on the analysis of each waste container. The Confirmation Report also documents the DQO reconciliation requirements defined in Section B3 of the QAPjP (Reference 3.1.17).

3.0 References, Definitions, and Developmental Resources

3.1 References

- 3.1.1 40 CFR Part 261, "Identification and Listing of Hazardous Waste"
- 3.1.2 40 CFR Part 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"
- 3.1.3 CAO-94-1012, "Quality Assurance Program Document (QAPD)"
- 3.1.4 DOE/LLW-217, "DOE Waste Treatability Group Guidance"
- 3.1.5 DOE/WIPP-069, "Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WIPP-WAC)"
- 3.1.6 DOE/WIPP 89-004, "TRUPACT-II Content Codes (TRUCON Manual)"
- 3.1.7 NMED 1999, WIPP RCRA Part B Permit (#NM4890139088-TSDF), Attachment B, Waste Analysis Plan (WIPP-WAP)
- 3.1.8 Public Law 102-579, 106 Stat. 4777 (as amended by Public Law 104-201), "Waste Isolation Pilot Plant Land Withdrawal Act"
- 3.1.9 U.S. Nuclear Regulatory Commission, Safety Analysis Report for the TRUPACT-II Shipping Package (TRUPACT-II SAR), NRC Docket No. 71-9218.
- 3.1.10 TC-AP-01.1.2, "WIPP TRU Waste Characterization Project Level Data Review And Reporting"
- 3.1.11 PR-AP-17.1, "Operation of the Project Records Management System"
- 3.1.12 QD-AP-15.1, "Nonconformance Reporting for Activities, Items and Materials"
- 3.1.13 TC-AP-01.1.1, "Completion of TRU Waste Stream Profile Form"
- 3.1.14 TCP-98-03.1, "Newly Generated Waste Process Descriptions"
- 3.1.15 TC-OP-01.4, "Segregation and Packaging of TRU Waste"
- 3.1.16 TC-OP-01.5, "Packaging Video Documentation"
- 3.1.17 TCP-98-02, "Transuranic Waste Characterization Quality Assurance Project Plan for the BCLDP TRU Waste Certification Program (QAPjP)"
- 3.1.18 TCP-98-04, "Mobile Vendor Interface Plan"
- 3.1.19 TCP-98-05, "Training Plan for the BCLDP TRU WCP"
- 3.1.20 TC-AP-01.1.3, "RCRA Characterization of TRU Waste to be Disposed of at WIPP"
- 3.1.21 WA-OP-033, "Sampling of Waste Materials for Chemical and/or Radiological Characterization"

3.2 Definitions

Refer to the BCLDP Procedure Dictionary for definitions of the following terms:

Acceptable Knowledge	Tentatively Identified
Correspondence	Compound
Discrepancy	Unpublished Data
Discrepancy Reports	Waste Material Parameter
Published Documentation	Waste Matrix Code
RCRA	Waste Matrix Code Groups
<ul style="list-style-type: none"> • Source Document Reference Number Log • Summary Category Groups 	Waste Stream
Transuranic (TRU) Waste	

3.3 Developmental Resources

Not applicable

4.0 General

Not applicable.

5.0 Procedure

This section describes the methodology used for collection, review, and compilation of AK for the characterization of TRU waste. Also described is the approach used to resolve discrepancies found in AK sources and discrepancies identified during confirmation. Implementation of this procedure creates a coherent, traceable, and accessible AK record. The BCLDP AK program responsibilities are provided in Exhibit 4. Unless otherwise noted, all steps in this section are to be performed by the **AK Subject Matter Expert**.

5.1 **AK Data Collection and Preparation of the Acceptable Knowledge Source Document Review Summary**

This section describes the process used by the **AK Subject Matter Expert**, or **Data Collection Technicians** under the guidance of the AK Subject Matter Expert, to collect documentation from a variety of sources. As this information is collected, it is important to document the source of the information and any supporting historical information that will assist the future review or assessment of the documentation on Form DDO-411 (known as the Acceptable Knowledge Source Document Review Summary; refer to Section 7.1.1). The **AK Subject Matter Expert** must be cognizant of AK data sources and the purpose of the information being sought.

- 5.1.1 Obtain the required TRU waste management program information and TRU waste stream information. Collect supplemental documentation as appropriate to verify or support required information, or to resolve discrepancies. The required AK documentation and examples of supplemental AK is provided in Exhibit 1. If sufficient AK is not available, generate a Nonconformance Report that describes corrective actions to be taken to fully characterize the waste, including but not limited to, visual examination and/or analysis during repackaging.
- 5.1.2 If the AK information is to be collected by a **Data Collection Technician**, the responsible **AK Subject Matter Expert** provides the **Data Collection Technician** an AK Collection Checklist. The checklist identifies the sources of information that should be reviewed (e.g., operating procedures, databases, reports) and specific AK information required. Examples of items to be included on the checklist are provided in Exhibit 2.
- 5.1.3 Obtain complete documents or complete copies of documents when feasible. When it is not feasible, copy applicable information along with portions of the document that define source contents, including cover sheets, executive summaries, introductions, and table of contents, if available. For documents with reference sections, locate, and obtain references as applicable. If the documentation cannot be reproduced or removed from the source (i.e., classified documents or databases), or if the information is obtained through oral interview, summarize the information obtained in correspondence on Form DDO-411.
- 5.1.4 Document on Form DDO-411 the source, date, and type of information extracted from electronic databases. Database maps, dictionaries, format, history, or other supporting documentation can also be obtained, if necessary.
- 5.1.5 Document on Form DDO-411 the location, box, tape, or reel of information from microfilm or microfiche.
- 5.1.6 Document on Form DDO-411, relevant AK information resulting from meetings, telecommunications, and interviews, including interviewer name, interviewee (or attendee), date, and details of discussions. Data limitations or discrepancies shall be noted if identified.

5.2 **AK Data Review and Completion of the Acceptable Knowledge Source Document Review Summary**

This section describes the process used by the **AK Subject Matter Expert** to review source information and complete Form DDO-411. This form is completed to categorize, summarize, and document the utility/limitations of each AK source. During the review process, required AK information specified in Exhibit 2 shall be sought.

- 5.2.1 Categorize the source of information as “Published Documentation,” “Unpublished Data,” “Correspondence,” or “Discrepancy Report,” based on the definitions in Section 3.2.
- 5.2.2 Obtain a unique Source Document Reference Number for each information source collected from the **TRU Waste Program Project Manager**/designee. This unique identifier serves as a road map because it is used to provide a cross-reference to the AK source in the TRU Waste Management Documentation (Section 5.3), the TRU Waste Stream Process Descriptions (Section 5.4), and/or the TRU Waste Confirmation Report(s) (Section 5.5).
- 5.2.3 Review and/or provide the title or description of the information. For documents with titles, provide all subtitles, authors, reference numbers, document dates, and revision information. For all other data, briefly describe the source. For example: “Analytical data generated during waste analysis,” or “Memorandum from John Doe to Mary Smith (dated mm/yy).”
- 5.2.4 Review and/or describe the source of the information. Note the site, group, or organization responsible for development, revision, or control of the information. For incomplete documents or databases, identify the location of the source document or database. Include the specific location of information obtained from microfilm or microfiche (box, tape, reel, etc.). For example: “Partial document copied from microfilm in the possession of [insert source owner’s name, title, and group affiliation].” For correspondence not generated by this program, identify the individual or source of the information. For example: “Letter was provided by Joe Smith, Waste Management Specialist, Waste Management Operations.”
- 5.2.5 Review and/or summarize the AK contained in the source document. This description shall be brief, but contain enough detail that a reviewer will be able to determine the utility and limitations of the information contained. For example: “This document summarizes the procedure used to solidify

organic liquids, including process inputs and packaging. The document was published in 1988, and no input information is available for waste generated after this date.” Provide sufficient detail in the summary to justify the use of the documentation as a source of AK.

5.2.6 The AK Subject Matter Expert shall sign and date Form DDO-411.

5.2.7 Submit Form DDO-411 to SPM to include pertinent information in the Source Document Reference Number Log.

5.3 AK Data Compilation – Preparation of the TRU Waste Management Document

This section describes the process used by the **AK Subject Matter Expert** to compile the TRU waste management documentation collected and reviewed (see Sections 5.1 and 5.2) into a comprehensive, auditable, and published report, known as the AK Document created for each facility that historically generated TRU waste. The AK Subject Matter Expert summarizes the required TRU waste management program information in a AK Document for each facility as specified in the following steps:

5.3.1 Include maps of the site with the areas and facilities involved in TRU waste generation, treatment, and storage identified.

5.3.2 5.3.2 Include the site mission as related to TRU waste generation and management.

5.3.3 Include descriptions of the operations that historically generated and currently generate TRU waste at the site (e.g., research and development or decontamination and decommissioning).

5.3.4 Identify the waste identification or characterization schemes used in the facility .

5.3.5 Estimate the radioisotopic ratios.

5.3.6 Determine the types and quantities of potential TRU waste materials present in inventory historically generated by this facility.

5.3.7 In addition provide the following information:

- An assessment of operations to determine if the TRU waste materials meet the definition of defense waste as specified in the WIPP-WAC.
- An assessment to determine if the TRU waste materials meet the definition of spent nuclear fuel or high level waste as specified in the

Waste Isolation Pilot Plant Land Withdrawal Act (Reference 3.1.8).

- An assessment of the inventory to identify prohibited items listed in Section B-1c of the QAPjP (Reference 3.1.17). Evidence of prohibited items must be summarized in the AK documentation for consideration during subsequent waste processing and packaging. These prohibited items will be discussed in the descriptions of the waste populations.
- 5.3.8 Segregate the existing waste materials identified into waste populations that have similar physical and chemical properties. These populations represent the waste material inputs to the processes that produce TRU waste streams during BCLDP waste packaging, processing, and segregation operations. These populations are delineated into TRU waste streams (waste material generated from a single process or activity that is similar in material, physical form, and hazardous constituents) during preparation of AK Process Descriptions (Section 5.4).
- 5.3.9 For each population provide a description of the waste matrix and assign the appropriate Waste Matrix Code to the waste in accordance with DOE Waste Treatability Group Guidance (Reference 3.1.4).
- 5.3.10 Review the required information to determine if the waste population is listed or hazardous because it is mixed with a waste listed in 40 CFR Part 261, Subpart D. Assign the appropriate EPA hazardous waste number(s) unless the documented use of the listed constituent precludes the assignment.
- 5.3.11 Review the required information to determine if the documentation identifies the presence of toxicity characteristic (TC) constituents specified in 40 CFR 261, Subpart C. Assign the appropriate EPA hazardous waste number(s), unless data is available to demonstrate that the concentration of the constituent is below the regulatory threshold, or the waste is also listed for the same constituent.
- 5.3.12 Provide the rationale for the RCRA characteristic and listed waste determinations. For waste materials that will be fully characterized during packaging or processing, note that data are insufficient and that additional research will be required to fully characterize the waste.
- 5.3.13 Resolve discrepancies between sources of AK documentation in accordance with Section 5.6.

5.3.14 Create a roadmap to the AK sources by referencing the unique Source Document Reference Numbers at the point in the document where the source was used.

5.3.15 Submit the document for review by cognizant personnel familiar with operations and waste materials described by the document.

5.3.16 Document the resolution of all comments.

5.3.17 Submit the source document to the SPM for filing.

5.4 AK Data Compilation – Preparation of the AK Process Description

This section describes the process used by the **AK Subject Matter Expert** to compile the AK data generated by Sections 5.1, 5.2, and 5.3 into a comprehensive, auditable, and published record for information relating to the characterization of TRU waste streams. The **AK Subject Matter** expert prepares the AK Process Descriptions to describe each waste packaging and treatment process and associated TRU waste streams. The AK Process Description must define the incoming waste material to be processed, other process inputs, and TRU waste streams generated by the process.

The **AK Subject Matter Expert** utilizes the AK documentation created in Sections 5.1, 5.2, and 5.3 to prepare the AK Waste Process Description that summarizes the required TRU waste stream information, as specified in the following steps:

- 5.4.1 Identify the building(s) and/or area(s) from which the TRU waste stream(s) was or is generated. For the purposes of the BCLDP, waste streams will be delineated by grouping materials generated by each process from a single facility (i.e., JN-1 or JN-4) into the most specific waste matrix code practical, based on the chemical characterization (assigned RCRA codes) and physical composition.
- 5.4.2 Identify the waste generating processes described for each building /area, room, and workstation, as appropriate. Correlate, with regard to time period of generation, the waste streams generated from the same buildings and processes, as appropriate (e.g., sludge, combustibles, metals, glass).
- 5.4.3 Prepare process flow diagrams. Prepare a diagram that identifies the flow of materials through TRU waste generating process. The diagram must identify inputs, subprocesses, major decision points, TRU waste streams, and other process outputs, as applicable.

- 5.4.4 Identify the process inputs or other information that describe the physical form of the waste stream (may include packaging), in addition to the chemical and radionuclide contaminants.
- 5.4.5 Identify the waste material parameters listed in Table B3-1 of the QAPjP for each waste stream, and estimate the relative weights of each waste material parameter (these weights may be presented as ranges for variable waste streams). Do not consider the container material or the liner material as part of the waste matrix, and therefore do not include container or liner weights in the waste material parameter weight estimations. However, absorbents, bracing materials, and inner packaging (e.g., plastic bags and ice cream cartons) are to be considered part of the waste matrix and the weights of items such as these are to be included when estimating the waste material parameter weights. Document the assumptions used for estimates in a letter to the AK Record (correspondence).
- 5.4.6 Assign the appropriate Waste Matrix Code (e.g., 5410) to the waste stream in accordance with DOE Waste Treatability Group Guidance (Reference 3.1.4)
- 5.4.7 Review the collected AK information (including the AK characterization determinations made for the waste inputs in Section 5.3) to determine if the waste is a listed waste or was mixed with a waste listed in 40 CFR Part 261, Subpart D. Assign the appropriate EPA hazardous waste number(s) unless an alternative assignment is chosen (justification must be documented).
- 5.4.8 Review the collected AK information (including the AK characterization determinations made for the waste inputs in Section 5.3) to determine if the documentation identifies the presence of toxicity characteristic constituents specified in 40 CFR 261, Subpart C. Assign the appropriate EPA hazardous waste number(s), unless data are available to demonstrate that the concentration of the constituent is below the regulatory threshold, or the waste is also listed for the same constituent.
- 5.4.9 Review the AK documentation and make a TSCA waste determination to determine if polychlorinated biphenyl compounds (PCBs) could be present in the waste at or above 50 parts per million (refer to Section B1-c of the QAPjP and WIPP-WAP; and 40 CFR 761).
- 5.4.10 Assign a unique Waste Stream Identification Number to each TRU waste stream based on the Waste Matrix Code (e.g., 5410-01, 5410-02, 5410-03).

- 5.4.11 Provide the rationale for the RCRA characteristic and TSCA waste determinations for each waste stream. In the case of discrepancies in information, document the resolution of discrepancies in accordance with Section 5.6.
- 5.4.12 For each waste stream, assign the appropriate Summary Category Group (i.e., S3000, S4000, or S5000).
- 5.4.13 For each waste stream, assign the appropriate Waste Matrix Code Group (solidified inorganics, solidified organics, salt waste, soils, lead/cadmium metal, inorganic monometal waste, combustible waste, graphite, filters, heterogeneous debris waste, and uncategorized metal).
- 5.4.14 Identify the radionuclides for each waste stream and assign the appropriate isotopic mix to each waste stream.
- 5.4.15 Provide the volume and generation date range for each TRU waste stream generated at the site, including historical generation through future projections. Based on the inventory to be processed, prepare an estimate of the amount of TRU waste projected to be generated for each stream and the date range. Document the assumptions used for the estimates in a letter to the AK Record (correspondence). Report the volume in cubic meters.
- 5.4.16 Assign the appropriate TRUCON Content Codes to each TRU waste stream.

Waste matrixes comprised of a mixture of organic and inorganic materials where the estimated amount of organic materials exceeds one percent must be assigned the appropriate organic TRUCON Content Code (refer to the TRUCON Manual, Reference 3.1.6).
- 5.4.17 Resolve discrepancies between sources of AK documentation in accordance with Section 5.6.
- 5.4.18 Create a roadmap to the AK sources by referencing the unique Source Document Reference Numbers at the point(s) in the document where the source was used.
- 5.4.19 Submit the document for review by cognizant personnel familiar with operations and waste materials described by the document.
- 5.4.20 Document the resolution of all comments.
- 5.4.21 Submit the source document to the SPM for filing.

5.4.22 If necessary, resolve discrepancies between actual and predicted process information in accordance with Section 5.6 and update the AK Process Description.

5.5 AK Data Compilation – Preparation of the TRU Waste Stream Confirmation Report

This section describes the process used by the **AK Subject Matter Expert** to compare the TRU waste management and waste stream documentation (Sections 5.3 and 5.4) with the information generated during packaging, inspection, and confirmation activities. The TRU Waste Stream Confirmation Report is prepared in conjunction with the AK Summary Report and Waste Stream Profile Form (WSPF) to verify AK, identify any process deviations, resolve discrepancies, and ensure that the Program Data Quality Objectives (DQOs) have been achieved. For each waste stream, obtain the following documentation, as applicable:

- Work Instructions (Form DDO-104) relating to the process(es) that generated the waste stream.
- Summary and/or Special Report Forms (Form DDO-103).
- TRU Waste Package Loading Record (Form DDO-438) for each waste container.
- Waste Management Checklists (Form DDO-164).
- The relevant AK Process Description(s), including discrepancy reports
- Dose-to-Curie radiological parameters report for each container.
- Videotape record for each container.
- Completed Data Generation and Project Level Validation Packages.
- RH TRU waste confirmatory radiological sampling data.

5.5.1 This section describes the process used by the **AK Subject Matter Expert** to compare and review the Work Instructions, Summary and/or Special Report Forms, TRU Waste Packaging Loading Record, and Waste Management Checklists. Verify and document the following process and waste matrix AK information from the relevant AK Process Description(s):

- The area where the waste streams was generated.
- The waste inventory processed.
- Process inputs and outputs.
- Actual volume of the waste streams and time period of generation.
- The process that generated the waste stream.
- Physical description of the waste steam including packaging.
- Presence/absence of hazardous materials in the waste.
- Absence of prohibited items.

After the WSPF attachments have been completed in accordance with procedure TC-AP-01.1.1 (Reference 3.1.13) review these forms to assure the parameters in the following steps have been determined.

5.5.2 Waste Matrix Code

- Verify that appropriate Summary Category Group, Waste Matrix Code (e.g., S5410) and Waste Matrix Code Group have been assigned per Section 5.4, Step 5.4.6, and 5.4.13 and that the Waste Matrix Code agrees with the TRU Waste Packaging Loading Form DDO-438. If issues arise, use the videotape record to verify the correct assignment of the Summary Category Group and Waste Matrix Code. If the waste stream or any container must be reassigned to a different code, an AK re-evaluation must be performed (Section 5.7).

5.5.3 Waste material parameter weights

- Use the TRU Waste Packaging Loading Record and/or the video tape record to calculate the relative weights of each waste material parameter listed in Table B3-1 the QAPjP (refer to Section 5.4, Step 5.4.5, for a detailed description of the calculation methodology). Document the results and how the estimates were calculated in the Confirmation report or in a letter to the AK Record (correspondence). Verify that the material parameter weights as estimated using AK (refer to Section 5.4, Step 5.4.5) agree with the waste material parameter weights calculated from the TRU Waste Packaging Loading Record and/or videotape record. If necessary resolve discrepancies in accordance with Section 5.6 and update applicable AK Process Descriptions.

5.5.4 Use the Dose-to-Curie radiological parameters report for each container to verify:

- That waste contains greater than 100 nanocuries/gram TRU alpha emitting TRU isotopes with half lives exceeding 20 years.
- Total curies calculated for each container.
- Curies/liter is calculated for each container.
- Total curies of plutonium is calculated for each container.

5.5.5 Confirmation sampling requirements

- For each waste stream, refer to TCP-98-03.1 to verify that the required confirmation sampling requirements have been met based on the Waste Matrix Code or Summary Category Group.
- For RH TRU waste streams compare the sampling analysis report taken for radiological confirmation to the appropriate isotopic mix established by AK as described in DD-98-04.

5.5.6 In accordance with TC-AP-01.1.3, RCRA Characterization of TRU Waste to be Disposed of at WIPP, calculate mean concentrations, 90% upper confidence limit (UCL90) for the mean concentrations, standard deviations, and the number of samples collected for each volatile organic compound (VOC) in the headspace gas of each waste container in CH TRU waste streams.

- For each waste stream, determine if the calculated UCL90 exceeds the program required detection limit (PRQL) (Table B3-2 the QAPjP) for any of the constituents listed in 40 CFR Part 261, Subpart D, in the headspace gas. If the PRQL is exceeded, assign the EPA hazardous waste number (if not already assigned) for the constituent, unless the required review of the AK record demonstrates documented use of the listed constituent precludes the assignment.
- For each waste stream, determine if the calculated UCL90 exceeds the PRQL (Table B3-2 of the QAPjP) for any organic toxicity characteristic constituents specified in 40 CFR 261, Subpart C, in the headspace gas. If the PRQL is exceeded, assign the EPA hazardous waste number (if not already assigned) for the constituent, unless data are available to demonstrate that the

concentration of the constituent is below the regulatory threshold, or the waste is also listed for the same constituent.

5.5.7 Potential flammability of TRU headspace gases

For each waste stream, determine if the headspace gases meet the limitation for potentially flammable gases as follows:

- Determine if the assigned TRUCON content codes identify any of the flammable VOCs listed in the TRUPACT-II SAR (Reference 3.1.9), Appendix 1.3.7, Section 5.4, Table 5-8.
- Determine if the analytical headspace data identify any of the flammable VOCs listed in Table 5-8 (CH only).
- Determine whether the total concentration of potentially flammable VOCs is less than or equal to 500 ppm in the headspace of the payload container.

5.5.8 Obtain the UCL90 for the mean concentrations, standard deviations, and number of samples collected for VOCs, semivolatile organic compounds (SVOCs) and metals in the waste streams (S3000 and S4000 CH TRU waste streams only), if applicable.

- For homogeneous solids and soil/gravel waste streams (summary categories 3000 and 4000), compare the mean concentration for VOC, SVOC, and metal analyses to the Regulatory Threshold Limits (RTLs) in Table B3-11 the QAPjP. If the mean exceeds the RTL, assign the appropriate EPA hazardous waste number (if not already assigned) from 40 CFR 261, Subpart C, unless the waste is also listed for the same constituent.

5.5.9 Toxicity Characteristic (TC) under 40 CFR Part 261, Subpart C.

- For CH TRU homogeneous solids and soil/gravel waste streams (summary categories 3000 and 4000), compare the mean concentration for VOC, SVOC, and metal analyses to the TC concentrations listed in 40 CFR Part 261, Subpart C. If the mean exceeds the TC concentration, assign the appropriate EPA hazardous waste number (if not already assigned) from 40 CFR 261, Subpart C, unless the waste is also listed for the same constituent.

5.5.10 For CH TRU waste streams classified as hazardous or nonhazardous at the 90-percent confidence level.

- Refer to the calculations performed per procedure TC-AP-01.1.3, RCRA Characterization of TRU Waste to be Disposed of at WIPP.
- 5.5.11 Ensure that the correct EPA hazardous waste numbers are on the correct WSPF for each waste stream.
- Verify that the EPA hazardous waste numbers assigned to the waste stream (as verified in Step 5.5.6, Step 5.5.8, and Step 5.5.9) have been properly transferred to the WSPF.
- 5.5.12 For waste streams requiring PCB analysis (CH TRU only), verify that the combined concentration of the Aroclor compounds (listed in Table B3-6 of the WIPP-WAP) do not exceed 50 parts per million.
- Refer to the analytical data, as appropriate (i.e., only Waste Matrix Code S3200 is sampled for PCBs).
- 5.5.13 Whether all TICs were appropriately identified and reported in accordance with the requirements of the WIPP-WAP, Section B3-1, prior to submittal of a WSPF for the waste stream or the waste stream lot.
- Refer to the calculations performed per procedure TC-AP-01.1.3, RCRA Characterization of TRU Waste to be Disposed of at WIPP.
- 5.5.14 Whether the overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WIPP-WAP, Sections B3-2 through B3-8, prior to submittal of a WSPF for the waste stream or the waste stream lot.
- Refer to the checklists completed per TC-AP-01.1.2, WIPP TRU Waste Characterization Project Level Data Review and Reporting.
- 5.5.15 Whether the PRQLs for all analyses were met prior to submittal of a WSPF for the waste stream or the waste stream lot.
- Refer to the checklists completed per TC-AP-01.1.2, WIPP TRU Waste Characterization Project Level Data Review and Reporting.
- 5.5.16 Document all assumptions, calculations, and resolution of discrepancies either in the report or as a letter to the AK Record (Discrepancy Report). Resolve discrepancies between sources of AK documentation in accordance with section 5.6.
- 5.5.17 Report the percentage of waste containers which required reassignment to a new Waste Matrix Code and/or designation of different EPA hazardous waste numbers based on the reevaluation of AK or on obtaining sampling and analysis data as a measure of acceptable AK accuracy.

- 5.5.18 Create a roadmap to the AK sources by referencing the unique Source Document Reference Numbers at the point in the document where the source was used.
- 5.5.19 Ensure that the AK process information meets the QAOs relating to accuracy, completeness, comparability, and representativeness as specified in Section B3-9 of the QAPjP.
- 5.5.20 Submit the document for review by cognizant personnel familiar with operations and waste materials described by the document.
- 5.5.21 Document the resolution of all comments.
- 5.5.22 Submit any source documents to the SPM for filing.

5.6 Resolution of Discrepancies

Due to the nature of this program, discrepancies may be identified during the review of source documentation and during the confirmation process. This section describes the process used by the **AK Subject Matter Expert** to resolve and document inconsistencies between AK data sources and between AK documentation and data generated during inspection (packaging) and confirmation operations. Exhibit 3 illustrates the process used to compile AK and resolve discrepancies. This process also applies to resolution of discrepancies identified during TRU waste confirmation (Visual Examination, Head Space Gas Analysis, RH TRU radiological confirmation sampling, and Homogeneous Solids and Soil/Gravel Analysis as applicable).

- 5.6.1 Resolve the discrepancy using supplemental information from interviews, telephone contacts, correspondence, or other sources of supplemental information, as applicable. In the event that there is disagreement between sources, all EPA hazardous waste numbers indicated by the required and supplemental information shall be applied to the subject waste stream unless an alternative assignment is chosen (justification for the alternative assignment must be documented). For example:
 - If one source indicates that solvents were not part of a process, while another source indicates that carbon tetrachloride was used for degreasing parts, the F001 EPA hazardous waste number must be applied to the applicable waste streams.
 - If a VOC is detected in the solidified waste, but is not detected from the headspace gas sampling (or visa versa), the most conservative result is used to assign the hazardous waste number, as applicable.

- 5.6.2 Document resolution of discrepancies between sources of AK in a Discrepancy Report to be maintained as a source in the AK record. For discrepancies identified during confirmation activities, document the resolution of the inconsistency in the Confirmation Report for each affected waste stream (Section 5.5). Waste streams or containers with unresolved discrepancies will not be shipped to WIPP and shipments of waste streams with identified discrepancies will cease until resolved.

5.7 AK Re-Evaluation

If during AK confirmation, visual examination of a waste stream determines the waste must be assigned to a different Waste Matrix Code, the **AK Subject Matter Expert** must take the following steps to re-evaluate the AK:

- 5.7.1 Review existing information based on the container identification number and document all differences in EPA hazardous waste number assignments.
- 5.7.2 If differences exist in the EPA hazardous waste numbers that were assigned, reassess and document all required AK information associated with the new designation in a Discrepancy Report.
- 5.7.3 Reassess and document all sampling and analytical data associated with the waste.
- 5.7.4 Verify and document that the reassigned Waste Matrix Code was generated within the specified time period, area, buildings, and waste generating process; and that the process material inputs are consistent with the waste material parameters identified during visual examination.
- 5.7.5 Record all changes to AK in a Discrepancy Report in accordance with Section 5.6 and update AK Process Descriptions as necessary.
- 5.7.6 If discrepancies exist between the AK information sources for the reassigned Waste Matrix Code, the resolution must be documented in a Nonconformance Report per QD-AP-15.1, Nonconformance Reporting for Activities, Items, and Materials (Reference 3.1.12).
- 5.7.7 The Nonconformance Report must document the segregation of this container and define the corrective actions necessary to fully characterize the waste.

6.0 Records

The following records are maintained as permanent quality records in accordance with PR-AP-17.1, Operation of the Project Records Management System (Reference 3.1.11).

- DDO-411, Acceptable Knowledge Source Document Review Summary
- All sources of AK documentation
- All AK reports generated by this procedure
- DDO-177, Nonconformance Reports, as generated

7.0 Forms, Exhibits, and Attachments

7.1 Forms

- DDO-411, Acceptable Knowledge Source Document Review Summary
- DDO-438, TRU Waste Packaging Loading Record
- DDO-439, TRU Waste Payload Container Nuclear Properties Data

7.2 Exhibits

- Exhibit 1, Required and Supplemental AK Documentation
- Exhibit 2, Example AK Collection Checklist Items
- Exhibit 3, AK Compilation and Discrepancy Resolution Diagram
- Exhibit 4, BCLDP AK Program Responsibilities

7.3 Attachments

None.

**ACCEPTABLE KNOWLEDGE SOURCE DOCUMENT
REVIEW SUMMARY**

REFERENCE NUMBER: _____

ACCEPTABLE KNOWLEDGE TYPE: ☐ Published Documentation
 ☐ Unpublished Data
 ☐ Correspondence
 ☐ Discrepancy Report

TITLE/DESCRIPTION: _____

INFORMATION SOURCE: _____

SUMMARY: _____

AK Subject Matter Expert: _____ Date: _____

EXHIBIT 1

REQUIRED AND SUPPLEMENTAL AK DOCUMENTATION

TRU Waste Management Program Information

- Maps of the site with the areas and facilities involved in TRU waste generation, treatment, and storage identified.
- Documentation describing the facility mission as related to TRU waste generation and management, including the identification of defense and non-defense operations.
- Documentation that identifies and describes operations that generate TRU waste at the site.
- Waste identification or characterization schemes used at the facility.
- Types and quantities of TRU waste generated at the facility, including historical generation through future projections.
- Correlation of waste streams generated from the same building and process, as appropriate.
- Waste certification procedures for wastes to be sent to the Waste Isolation Pilot Plant (WIPP) facility.

TRU Waste Stream Information

- Information identifying the building(s) and/or area(s) from which the TRU waste was or is generated.
- Volumes of waste generated and time period of generation for each waste stream.
- Waste generating process described for each building (e.g., batch waste stream generated during decommissioning operations of glove boxes).
- Process flow diagrams (e.g., a diagram illustrating glove boxes from specific buildings to a size reduction facility to a container storage area). In the case of research/development, analytical laboratory waste, or other similar processes where process flow diagrams cannot be created, a description of the waste generating processes, rather than a formal process flow diagram, may be included if this modification is justified and the justification is placed in the auditable record.
- Identification of process inputs or other information that describe the physical form of the waste stream (may include packaging), in addition to the chemical and radionuclide contaminants.
- Waste material parameters that compose the waste for the assignment of a Waste Matrix Code to each waste stream.
- Hazardous constituents in the waste for the assignment of the appropriate EPA hazardous waste numbers to each waste stream.

EXHIBIT 1

REQUIRED AND SUPPLEMENTAL AK DOCUMENTATION (Cont.)

Supplemental AK Documentation

- Process design documents (e.g., Title II Design).
- Standard operating procedures that may include a list of raw materials or reagents, a description of the process or experiment generating the waste, and a description of the waste generated and how the wastes are managed at the point of generation.
- Preliminary and Final Safety Analysis Reports and technical safety requirements.
- Waste Packaging logs.
- Test plans or research project reports that describe the reagents and other raw materials used in experiments.
- Site databases (e.g., chemical inventory database for SARA Title III requirements).
- Information from site personnel (e.g., documented interviews).
- Standard industry documents (e.g., industry specification sheets, handbooks, reference materials, or other vendor information).
- Analytical data relevant to the waste stream, including results from fingerprint analyses, spot checks, or routine verification sampling. This may include new information (or previously collected data) acquired apart from the confirmatory process which supplements required information (e.g., visual examination not performed in compliance with the WIPP-WAP).
- Material Safety Data Sheets, product labels, or other product information.
- Laboratory notebooks that detail the research processes and raw materials used in an experiment.
- Comparable or surrogate sampling and analysis data.

EXHIBIT 2
EXAMPLE AK COLLECTION CHECKLIST ITEMS

TRU Waste Management Program Information

- 1) Does/did the facility generate spent nuclear fuel (i.e., fuel that has been withdrawn from a nuclear reactor following irradiation [does not apply to a reactor used for R&D]) or high-level waste (i.e., waste which was generated from first cycle separation during the reprocessing of spent nuclear fuel)?
- 2) Was the TRU waste generated, in whole or in part, by atomic energy defense activities (i.e., is the waste “defense waste” as specified in the WIPP-WAC)?
- 3) What buildings and/or areas generate(d), treat(ed), and store(d) TRU waste (including maps and floor plans)?
- 4) What is and/or was the facilities mission as it relates to TRU waste generation and management (e.g., nuclear weapons research)?
- 5) What are/were the operations (overview) that generate(d) TRU waste (e.g., plutonium recovery)?
- 6) Were TRU waste operations related to defense activities and/or non-defense activities?
- 7) How is/was TRU waste segregated (e.g., item description codes, content codes, waste quantity)?
- 8) What methodology is/was used to characterize TRU waste with respect to RCRA regulations?
- 9) How is/was TRU waste correlated to the generation process(es) (e.g., room number)? If the room number is not assigned to the container, is there another way to identify the generation process(es)?
- 10) What grades of plutonium, uranium, etc. are/were processed (e.g., weapons-grade plutonium, enriched uranium), and where is their nominal isotopic composition identified?
- 11) What type(s) of assay systems are/were used to make TRU waste determinations and to identify and quantify specific radionuclides?
- 12) How was TRU waste managed differently before the first TRU Waste Certification Plan?

EXHIBIT 2
EXAMPLE AK COLLECTION CHECKLIST ITEMS (Cont.)

TRU Waste Stream Information

- 1) For each building or area, describe the TRU waste generating processes (when possible, include enough detail to design a process flow diagram).
- 2) What types of TRU waste were generated from each of the processes (e.g., combustibles, metal, glass, filters, graphite, pyrochemical salts, treatment sludge, etc.)?
- 3) What chemicals (e.g., organic solvents, metal compounds, nonhazardous cleaners) were used in each of the processes?
- 4) How were these chemicals used (e.g., solvent properties) in association with the generation of TRU waste?
- 5) What is the volume and time period projected for the TRU waste stream?
- 6) Was the use of any hazardous chemicals eliminated? If so, when?
- 7) From which processes were any of the following generated? Were any of these items placed in TRU waste containers?
 - waste containing PCBs
 - liquids (especially ignitable or corrosive)
 - aerosol cans (punctured or unpunctured)
 - non-radioactive pyrophoric materials (e.g., metal powders)
 - hazardous wastes not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous waste)
 - oxidizing materials (e.g., wipes or filters with concentrated nitric acid)
 - reactive metals (e.g., calcium metal)
 - cyanide or sulfide bearing wastes
 - unleached ion exchange resin
 - explosives
 - other reactive materials
 - waste exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA hazardous waste numbers D001, D002, or D003, respectively)
 - RH TRU mixed waste (waste with a surface dose rate greater than 200 millirem per hour)
 - cadmium shielding
 - lead (e.g., leaded glovebox gloves, leaded glass glovebox windows, lead bricks, lead containers, tin/lead solder)
 - fluorescent or incandescent bulbs
 - circuit boards (contain tin/lead or silver solder)
 - waste containing mercury

EXAMPLE AK COLLECTION CHECKLIST ITEMS (Cont.)

- 8) Were excess chemicals or other commercial chemical products placed in waste containers?
- 9) How were the wastes packaged (i.e., type of drum or box, vents, types of liners, absorbents, inner packaging configurations)?
- 10) What radionuclides were used in each of the processes?

EXHIBIT 3
AK COMPILATION AND DICREPANCY RESOLUTION

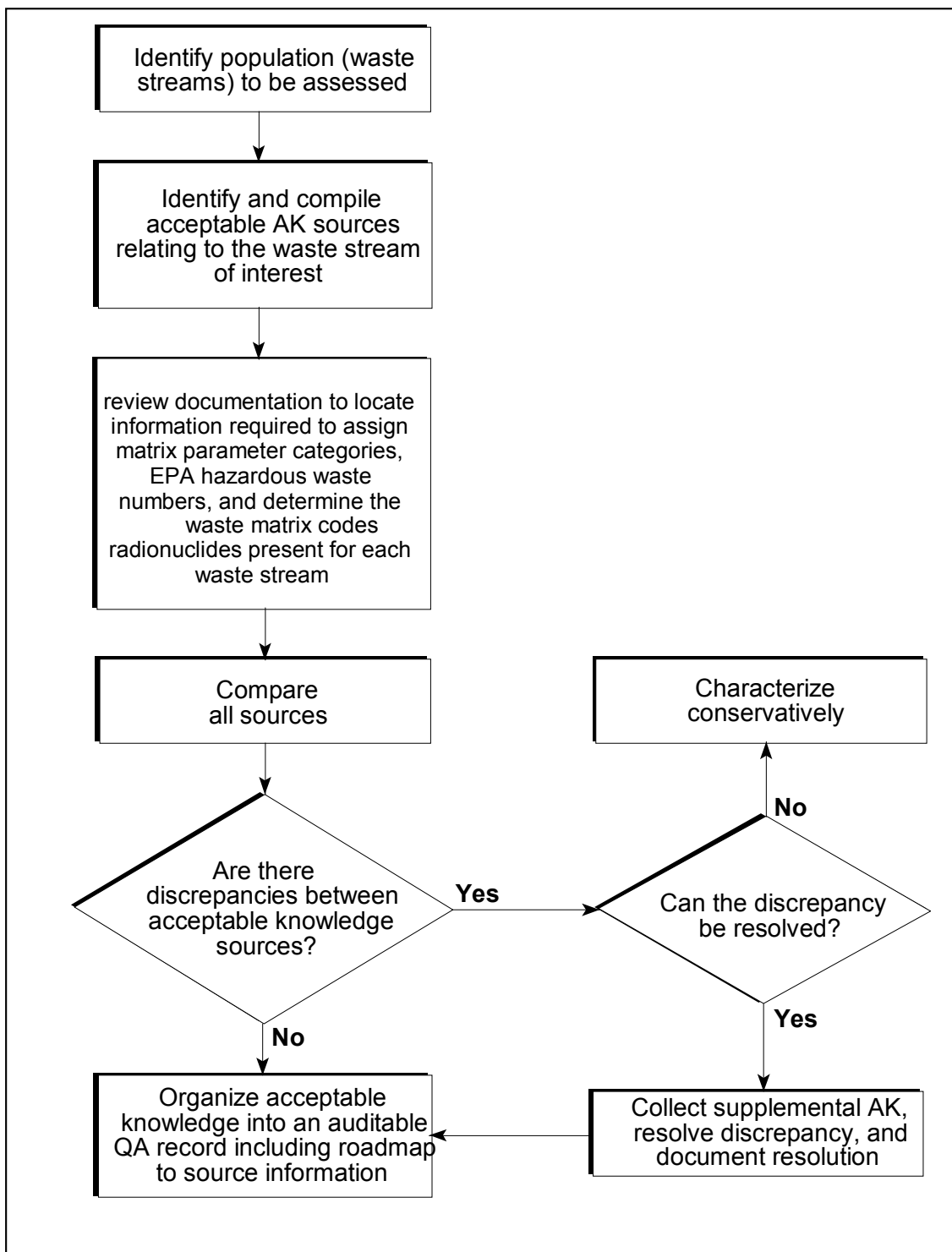


EXHIBIT 4

BCLDP AK PROGRAM RESPONSIBILITIES

The Decontamination and Decommissioning Operations (DDO) Program Manager is responsible for oversight of all activities relating to TRU waste certification and transportation. Responsibilities specific to this procedure include:

- Review and approval of this procedure and all revisions.
- Ensure that conditions adverse to quality are resolved and the corrective actions are implemented on time.

The DDO Quality Manager is responsible for facilitating implementation of quality requirements and practices into TRU waste certification and transportation activities, and verifying these operations are being performed effectively and in accordance with requirements. Responsibilities specific to this procedure include:

- Review and approval of this procedure and all revisions.
- Ensure that conditions adverse to quality are resolved and appropriate corrective actions are implemented on time.
- The verification consists of Independent Activity Assessments and Independent Programmatic Assessments.

The Field Operations Manager is responsible for providing operational and administrative support to the BCLDP TRU Waste Certification Program as well as interfacing with other BCLDP programs. Responsibilities specific to the procedure include:

- Ensure that the appointed personnel understand the requirements of this procedure.
- Review, approve, implement, and update this procedure.
- Ensure training requirements have been met per procedure TCP-98-05 (Reference 3.1.19)
- Assure that the AK Subject Matter Experts' training/qualifications in the following areas required by the QAPjP is documented:
 - Proficiency with the applicable WIPP-WAC and WIPP-WAP requirements.
 - Training related to the applicable state or federal RCRA regulations associated with solid and hazardous waste determinations.
 - Nonconformance process, including discrepancy resolution and reporting.

EXHIBIT 4

BCLDP AK PROGRAM RESPONSIBILITIES (Cont.)

The TRU Waste Program Project Manager functions as the TRU Waste Site Project Manager (SPM) and alternately as the TRU Waste Certification Official (TCO) and is responsible for the documentation and certification of all TRU waste payload containers prepared for shipment to WIPP in accordance with the WIPP-WAP (Reference 3.1.7), QAPjP (Reference 3.1.17) and the WIPP-WAC (Reference 3.1.5). This includes the management of the AK record created by the implementation of this procedure. Responsibilities specific to this procedure include:

- Maintain unique Source Document Reference Number Log and assign unique numbers as requested.
- Appoint qualified AK Subject Matter Experts and Data Collection Technicians to assemble and manage AK documentation.
- Ensure that records and documents are generated and managed in accordance with the WIPP Quality Assurance Program Document (QAPD) (see Reference 3.1.3).
- Ensure training requirements have been met per procedure TCP-98-05 (Reference 3.1.19).
- Review and approve the AK reports generated by implementation of Sections 5.3, 5.4, and 5.5 of this procedure.
- Meet the training requirements for the AK Subject Matter Expert.
- Ensure that AK process information meets the Quality Assurance Objectives (QAOs) relating to Accuracy, Completeness, Comparability, Precision, and Representativeness per the QAPjP.
- Review and approve U.S. Environmental Protection Agency (EPA) hazardous waste numbers recommended by the AK Subject Matter Expert.
- Control and maintain source documents.

AK Subject Matter Experts must be qualified and trained on the collection, review, compilation, and discrepancy resolution of AK documentation, specifically:

- Collection, review, and compilation of AK documentation in accordance with this procedure.
- Resolve AK discrepancies in accordance with Section 5.4 of this procedure.
- Maintain current versions and read the applicable sections of the references listed in Section 3.1, including the WIPP-WAP and WIPP-WAC.

EXHIBIT 4

BCLDP AK PROGRAM RESPONSIBILITIES (Cont.)

- Must have experience identifying potential sources of AK documentation, including, but not limited to, cognizant personnel, libraries, and other historical documentation sources.
- Understand state and federal Resource Conservation and Recovery Act (RCRA) regulations relating to solid and hazardous waste determinations when recommending the assignment or reviewing the assignment of U.S. Environmental Protection Agency (EPA) hazardous waste numbers (see Reference 3.1.1).
- Understand the nonconformance reporting process described in QD-AP-15.1, Nonconformance Reporting for Activities, Items, and Materials (Reference 3.1.12).
- Provide guidance to the Data Collection Technicians to ensure that source documentation is appropriate and complete for incorporation into the AK record.

Data Collection Technicians are responsible for the collection and preliminary review of AK documentation sources at the direction of the AK Subject Matter Experts. This allows any individual at any location to collect AK information for this program with minimal direction from the AK Subject Matter Experts. Specific responsibilities include:

- Collect and review AK documentation in accordance with this procedure (Section 5.1) and the AK Collection Checklist.
- Read and understand Section B4 of the QAPjP and this procedure.